

Claims

1. A catheter useful for radiation treatment of a body which comprises:
an elongate, flexible catheter body having a proximal section and a distal
section;

5 a radioactive source bonded to a surface of the distal section of the catheter
body with sufficient bond strength that under normal conditions of use of the
catheter, the radioactive source will not detach from the catheter body, the
radioactive source providing radiation in an amount of from about 0.5 microcuries to
about 300 curies per centimeter length of the radioactive portion of the catheter
10 body; and

wherein the catheter body is sized and has sufficient strength and flexibility to
navigate a portion of a body so that the radioactive source can be positioned at a
desired location for treatment.

2. A catheter as claimed in claim 1, wherein the catheter body is a
15 balloon catheter body provided with an expandable portion and the radioactive
source is bonded to a surface of the expandable portion of the balloon catheter.

3. A catheter as claimed in claim 1, wherein the radioactive source is
bonded to an exterior surface of the catheter body.

4. A catheter as claimed in claim 1, wherein the radioactive source is
20 bonded to an interior surface of the catheter body.

5. A catheter as claimed in claim 1, further comprising a retractable
sheath which comprises a radiation shielding material, said retractable sheath being
positionable in a first, shielding position wherein the sheath encloses the portion of
the catheter body to which the radioactive source is bonded, and a second, retracted
25 position which exposes the portion of the catheter body to which radioactive source
is bonded to permit radiation treatment of a desired location in the body.

6. A catheter as claimed in claim 1, wherein the radioactive source
comprises carrier-free palladium-103.

7. A catheter useful for radiation treatment of a body which comprises:
30 an elongate, flexible catheter body having a proximal section and a distal
section;

a radioactive source housed within a cavity in the distal section of the catheter
body, the radioactive source providing radiation in an amount of from about 0.5

microcuries to about 300 curies per centimeter length of the radioactive portion of the catheter body;

at least a portion of the catheter body being removable to provide access to the cavity wherein the radioactive source is housed; and

5 wherein the catheter body is sized and has sufficient strength and flexibility to navigate a portion of a body so that the radioactive source can be positioned at a desired location for treatment.

8. A catheter as claimed in claim 7, wherein the radioactive source is provided in a form selected from the group consisting of: microspheres, pellets, fiber, ribbon, mesh, patch and film.

9. A catheter as claimed in claim 7, wherein the radioactive source is immobilized in a polymeric material.

10. A catheter as claimed in claim 9, wherein the polymeric material is a flexible polymeric material selected from the group consisting of elastomers, gels, hydrogels and foams.

11. A catheter as claimed in claim 7, further comprising a retractable sheath which comprises a radiation shielding material, said retractable sheath being positionable in a first, shielding position wherein the sheath encloses the portion of the catheter body to which the radioactive source is bonded, and a second, retracted position which exposes the portion of the catheter body to which radioactive source is bonded to permit radiation treatment of a desired location in the body.

12. A catheter as claimed in claim 7, wherein the radioactive source is housed in a carrier located in the distal end of the catheter body.

13. A catheter as claimed in claim 7, wherein the removable portion of the catheter body is a catheter attachment which encloses the cavity within which the radioactive source is housed, and the catheter attachment includes a plug which may be removed to provide access to the interior of said cavity.

14. A catheter as claimed in claim 7, wherein the radioactive source comprises carrier-free palladium-103.

15. A catheter useful for radiation treatment of a body which comprises: an elongate, flexible catheter body;

an elongate, flexible carrier having a proximal section and a distal section;

a radioactive source housed within a cavity in the distal section of the flexible carrier, the radioactive source providing radiation in an amount of from about 0.5 microcuries to about 300 curies per centimeter length of the radioactive portion of the flexible carrier;

5 at least a portion of the flexible carrier being removable to provide access to the cavity wherein the radioactive source is housed; and

 wherein the flexible carrier is sized and has sufficient strength and flexibility to navigate a portion of a body so that the radioactive source can be positioned at a desired location for treatment.

10 16. A catheter as claimed in claim 15, wherein the radioactive source is provided in a form selected from the group consisting of: microspheres, pellets, fiber, ribbon, mesh, patch and film.

 17. A catheter as claimed in claim 15, wherein the radioactive source is immobilized in a polymeric material.

15 18. A catheter as claimed in claim 17, wherein the polymeric material is a flexible polymeric material selected from the group consisting of: elastomers, gels, hydrogels and foams.

20 19. A catheter as claimed in claim 15, further comprising a retractable sheath which comprises a radiation shielding material, said retractable sheath being positionable in a first, shielding position wherein the sheath encloses the portion of the catheter body to which the radioactive source is bonded, and a second, retracted position which exposes the portion of the catheter body to which radioactive source is bonded to permit radiation treatment of a desired location in the body.

25 20. A catheter as claimed in claim 15, wherein the radioactive source comprises carrier-free palladium-103.

 21. A catheter attachment useful for radiation treatment of a body which comprises:

 a substrate;

30 a radioactive source associated with the substrate, the radioactive source providing radiation in an amount of from about 0.5 microcuries to about 300 curies per centimeter length of the radioactive portion of the catheter attachment; and

 wherein the catheter attachment includes structure for attaching the catheter attachment to a catheter at or near the distal end of the catheter so that the catheter

can be employed to position the radioactive source at a desired location for treatment.

22. A catheter attachment as claimed in claim 21, wherein the radioactive source is bonded to a surface of the substrate of the catheter attachment with sufficient bond strength that under normal conditions of use of the catheter attachment, the radioactive source will not detach from the catheter body.

23. A catheter attachment as claimed in claim 22, wherein the radioactive source is bonded to an external surface of the catheter body.

24. A catheter attachment as claimed in claim 22, wherein the radioactive source is bonded to an internal surface of the catheter body.

25. A catheter attachment as claimed in claim 21, wherein the catheter attachment includes an expandable portion and the radioactive source is bonded to the surface of the expandable portion.

26. A catheter attachment as claimed in claim 21, wherein the substrate defines a housing and the radioactive source is housed in the housing.

27. A catheter attachment as claimed in claim 26, wherein the radioactive source is housed in the housing and is provided in a form selected from the group consisting of: microspheres, pellets, fiber, ribbon, mesh, patch and film.

28. A catheter attachment as claimed in claim 26, wherein the radioactive source is immobilized in a polymeric material.

29. A catheter attachment as claimed in claim 28, wherein the polymeric material is a flexible polymeric material selected from the group consisting of: elastomers, gels, hydrogels and foams.

31. A catheter attachment as claimed in claim 21, wherein the radioactive source comprises carrier-free palladium-103.

32. A device for use with a catheter for delivery of a therapeutic radiation dose to a treatment zone which comprises:

an expandable housing,

a plurality of chambers in said housing in fluid communication with a fluid pathway for introduction and removal of fluid from said plurality of chambers,

a mount for mounting the device on a guide wire in a manner whereby the device can be guided through a body using said guide wire, and

a radiation source associated with said device,

said device being sized such that when expanded, the device conforms to the treatment zone to thereby substantially immobilize the device in the treatment zone.

33. The device as claimed in claim 32, wherein the structure of said chambers and housing being such that upon expansion of the device, a pathway for flow of bodily fluids through said device is provided such that the device does not occlude a vessel or lumen when expanded is said vessel or lumen.

34. The device as claimed in claim 32, wherein the radiation source is located on or substantially adjacent to an outer surface of the housing.

35. The device as claimed in claim 32, wherein the device further comprises a radiation stable outer coating which isolates the radioactive material from direct contact with the body to be treated during use of the device.

36. The device as claimed in claim 32, wherein the device is sized such that when expanded it conforms to the size of the treatment zone without substantially deforming surrounding body tissue to thereby minimize trauma in the treatment zone.